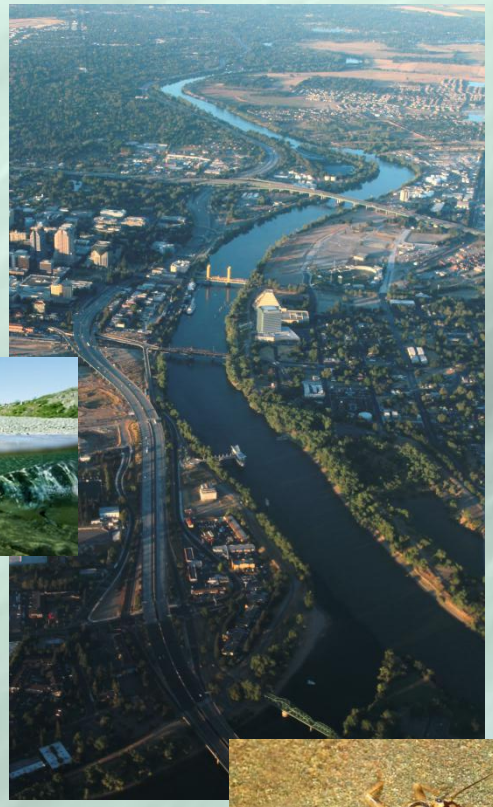


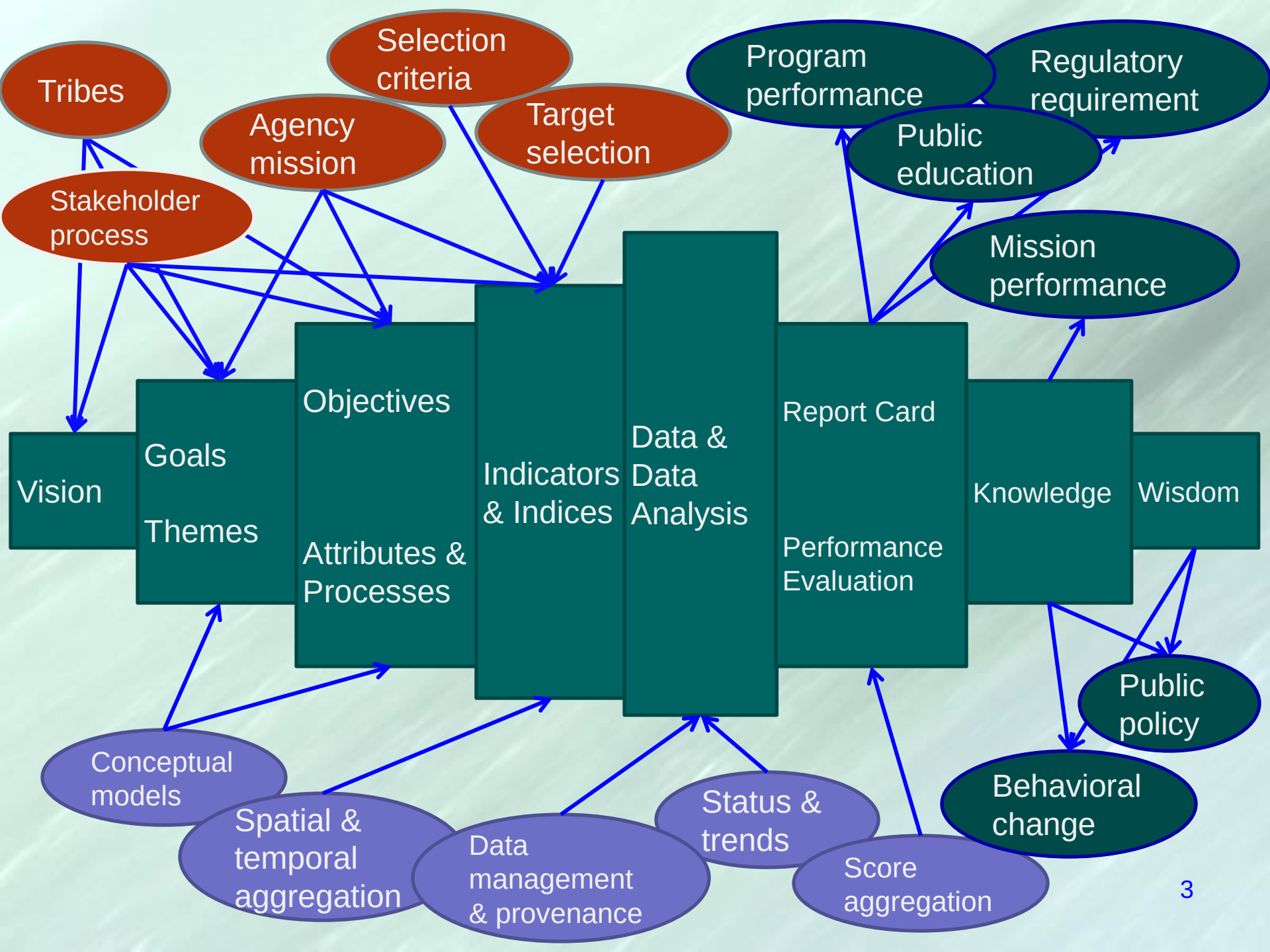
California Water Sustainability Indicators Framework

Status Update

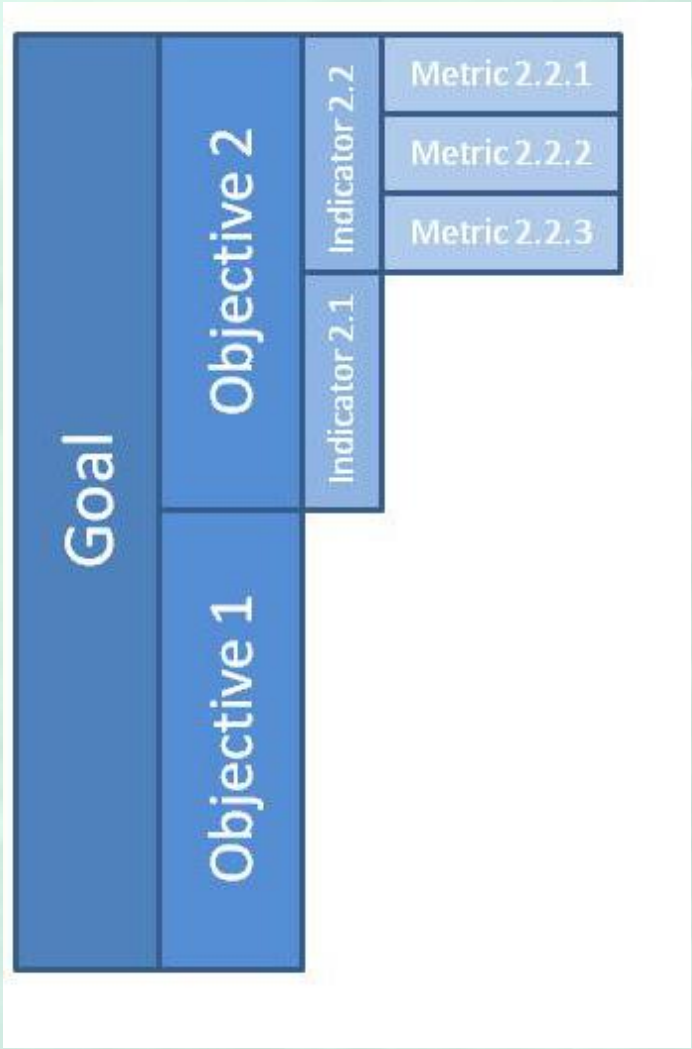
Fraser Shilling,
University of California, Davis

Water Plan Update 2013
CA Water Sustainability Indicators – Deliverables

- Analytical Framework
- Quantitative Pilot Studies
- Gap Analysis


Tribes
Selection criteria
Program performance
Regulatory requirement
Agency mission
Target selection
Public education
Stakeholder process
Mission performance
Vision
Goals
Themes
Objectives
Attributes & Processes
Indicators & Indices
Data & Data Analysis
Report Card
Performance Evaluation
Knowledge
Wisdom
Public policy
Conceptual models
Spatial & temporal aggregation
Data management & provenance
Status & trends
Score aggregation
Behavioral change

Organizing indicators



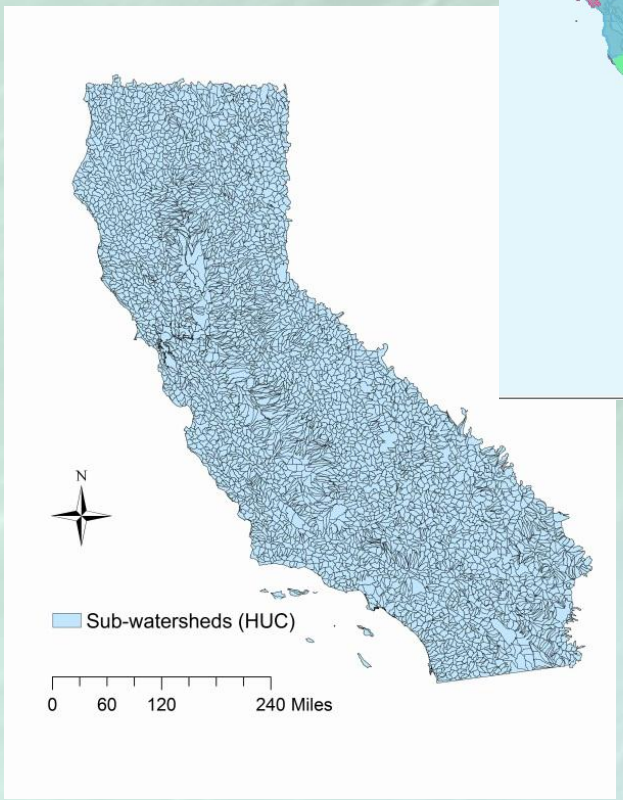
- Water supply reliability
- Water quality
- Ecosystem health
- Social benefits and equity
- Adaptive & sustainable management

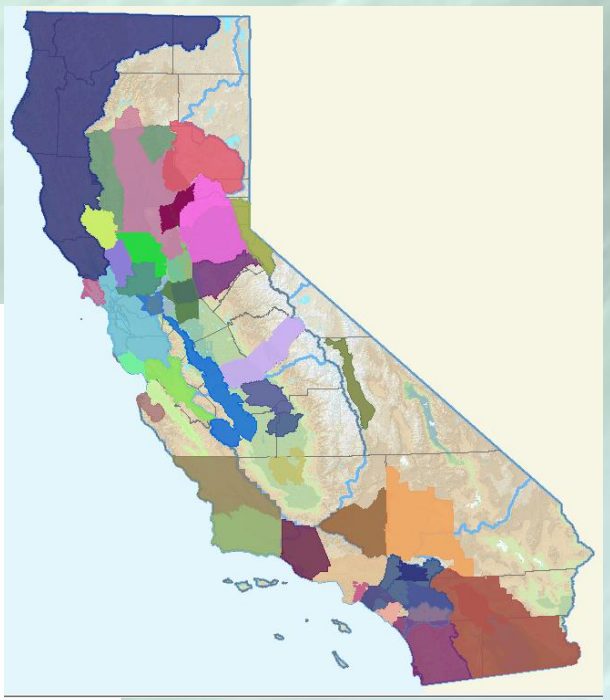
Proposed Water Sustainability Goals and Objectives	Relationship to CWP 2009
Goal 1: Manage and make decisions about water in a way that integrates water availability, environmental conditions, and community well-being for future generations.	Reflects overall goal of sustainability
Goal 2. Improve water supply reliability to meet human needs, reduce energy demand, and restore and maintain aquatic ecosystems and processes. *Objectives: Improve water use efficiency; Increase water recycling; Increase water conservation.*	CWP Objective 2, 9; RMS Reduce demand
Goal 3. Contribute to social and ecological beneficial uses and reduce impacts associated with inter-basin water transfers and to the Delta. *Objectives: Improve regional water movement operations and efficiency; Investigate new water technologies; Protect ecosystem services and benefits provided by intact and naturally-functioning Delta.*	CWP Objective 1, 2, 7, 11, RMS Operational efficiency
Goal 4. Increase quantity, quality, and reliability of drinking water, irrigation water, and in-stream flows *Objectives: Increase conjunctive management of new and recycled water from multiple sources.*	CWP Objective 3, 12, 13; RMS Increase water supply

Proposed Water Sustainability Goals and Objectives	Relationship to CWP 2009
Goal 5. Safeguard human and environmental health and secure California water supplies *Objectives: Protect and restore surface water and groundwater quality; Protect the natural systems that maintain these services.*	CWP Objective 4; RMS on water quality; chapter 4 discussion of water quality sustainability indicators
Goal 6. Protect and enhance environmental conditions by improving watershed, floodplain, and aquatic condition and processes. *Objectives: Practice, promote, improve, and expand environmental stewardship.*	CWP Objective 5, 12, 13; RMS Natural Resources
Goal 7. Integrate flood risk management with other water and land management and restoration activities. *Objectives: Improve land-use/cover to reduce flood risk; Improve floodplain-channel connections.*	CWP Objective 1, 6, 12, 13; RMS Improve flood
Goal 8. Support decision-making, especially in light of uncertainties, that support integrated regional water management and flood and water resources management systems. *Objectives: Improve and expand monitoring, data management, and analysis.*	CWP Objective 10; various RMSs; CWP Vol. 1 Chapter 6 Integrated Data and Analysis

Pilot: State scale

- Indicators evaluated at state extent, with varying units of analysis





Indicators being considered

- Impervious (developed) surfaces – effects on geomorphology, water quality
- Biotic index – fish and benthic macroinvertebrates
- Water use and availability
- Public support for water systems investment
- Equitable distribution of impacts & benefits
- Water footprint

Proposed Water Sustainability Goals and Objectives	Potential Indicators
Goal 1: Manage and make decisions about water in a way that integrates water availability, environmental conditions, and community well-being for future generations.	Water footprint Equitable distribution of impacts & benefits
Goal 2. Improve water supply reliability to meet human needs, reduce energy demand, and restore and maintain aquatic ecosystems and processes. *Objectives: Improve water use efficiency; Increase water recycling; Increase water conservation.*	Water use and availability
Goal 3. Contribute to social and ecological beneficial uses and reduce impacts associated with inter-basin water transfers and to the Delta. *Objectives: Improve regional water movement operations and efficiency; Investigate new water technologies; Protect ecosystem services and benefits provided by intact and naturally-functioning Delta.*	Impervious (developed) surfaces – effects on geomorphology, water quality Equitable distribution of impacts & benefits
Goal 4. Increase quantity, quality, and reliability of drinking water, irrigation water, and in-stream flows *Objectives: Increase conjunctive management of new and recycled water from multiple sources.*	Water use and availability

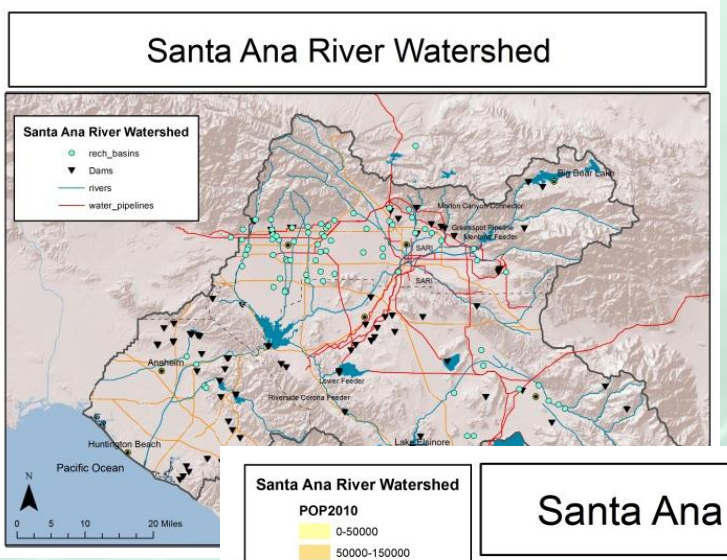
Proposed Water Sustainability Goals and Objectives	Potential Indicators
Goal 5. Safeguard human and environmental health and secure California water supplies *Objectives: Protect and restore surface water and groundwater quality; Protect the natural systems that maintain these services.*	Impervious (developed) surfaces – effects on geomorphology, water quality Biotic index – fish and benthic macroinvertebrates
Goal 6. Protect and enhance environmental conditions by improving watershed, floodplain, and aquatic condition and processes. *Objectives: Practice, promote, improve, and expand environmental stewardship.*	Public support for water systems investment
Goal 7. Integrate flood risk management with other water and land management and restoration activities. *Objectives: Improve land-use/cover to reduce flood risk; Improve floodplain-channel connections.*	Impervious (developed) surfaces – effects on geomorphology, water quality
Goal 8. Support decision-making, especially in light of uncertainties, that support integrated regional water management and flood and water resources management systems. *Objectives: Improve and expand monitoring, data management, and analysis.*	Still looking

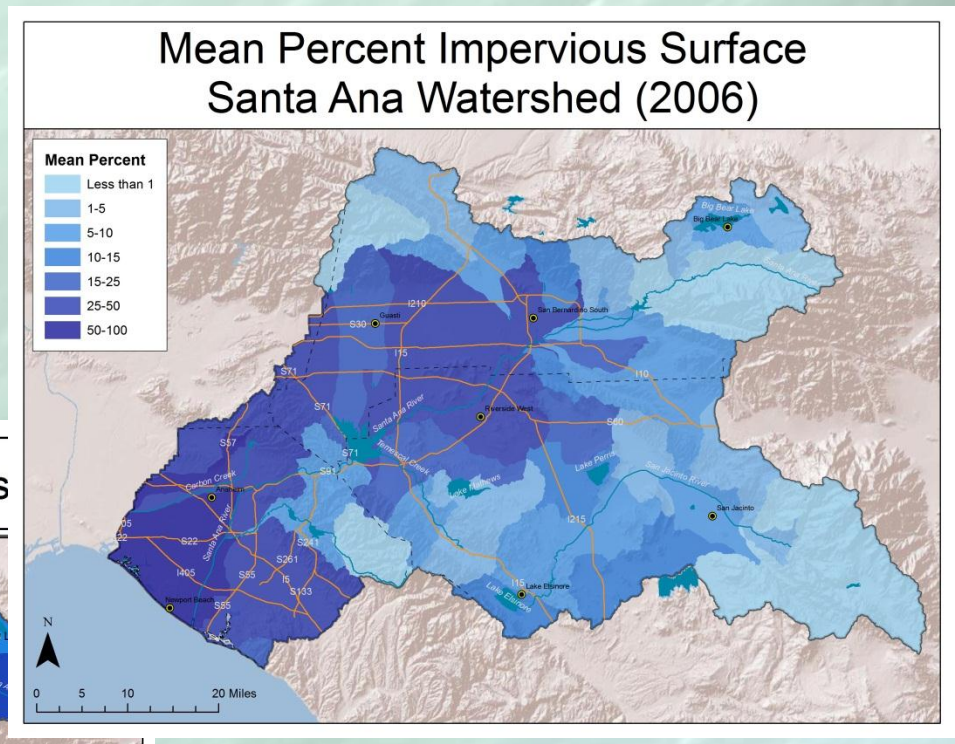
Pilot: Santa Ana Watershed Project Authority

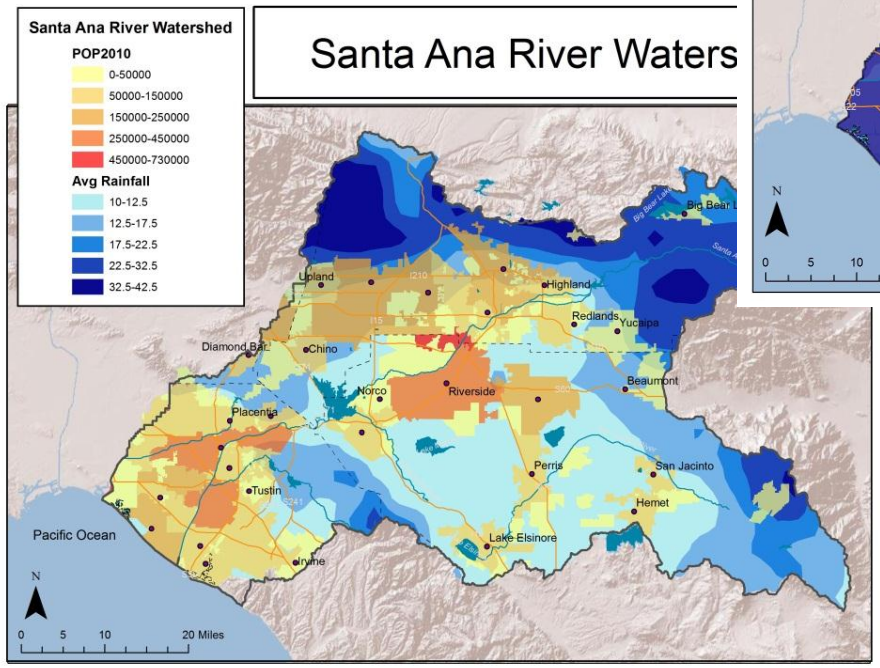
- One Water One Watershed 2.0
- Goal & objective selection
- Indicator selection
- Indicator evaluation
- Report card

Thanks to our collaborators at SAWPA and CWH

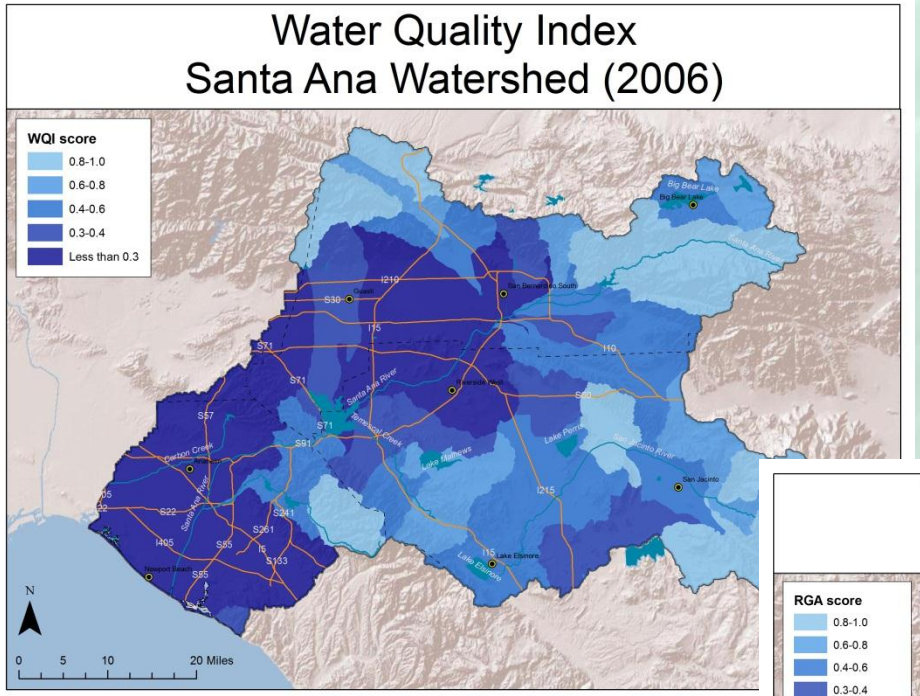
Pilot: Preliminary results

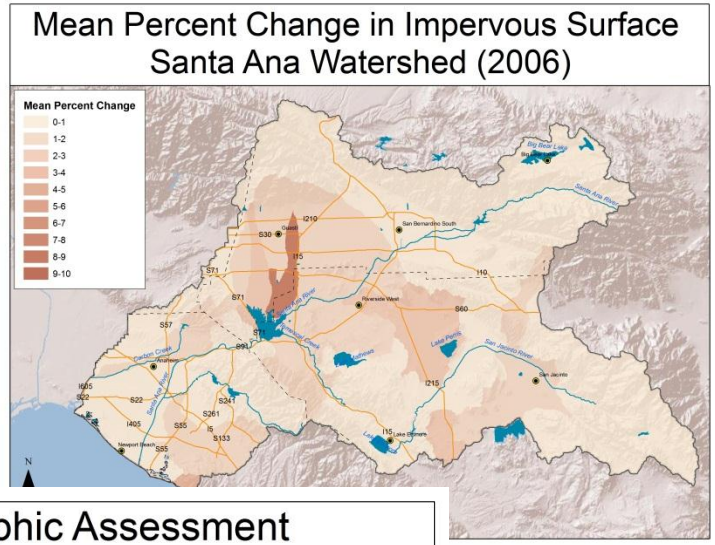


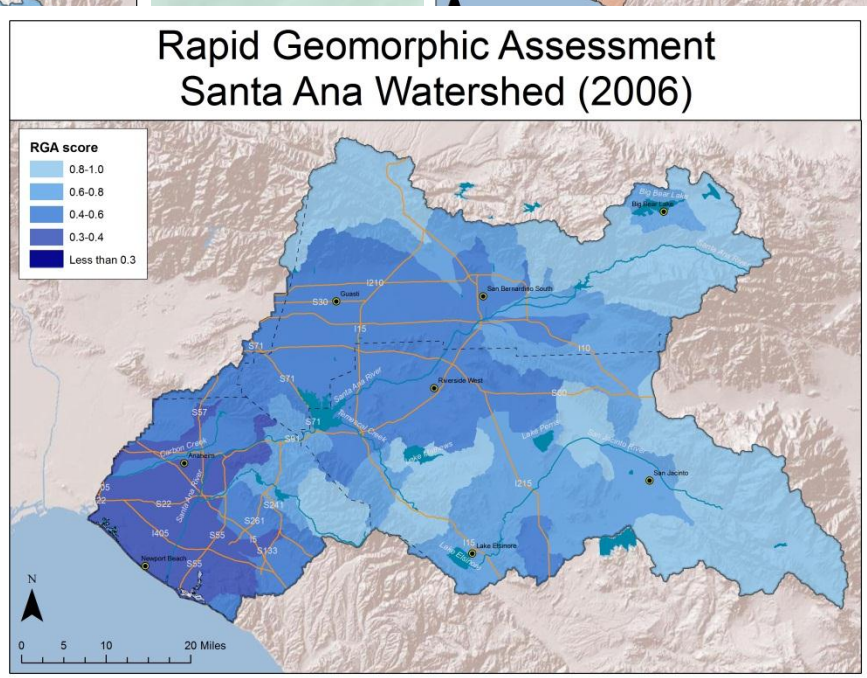




Pilot: Preliminary results







California Water Sustainability Atlas

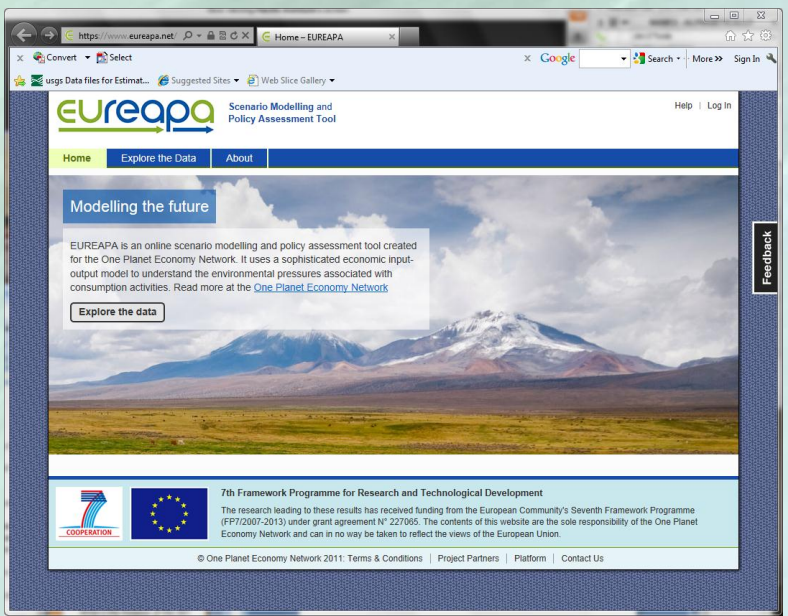
Decision Support System for Sustainable Water Management

What is a Decision Support System?

It is primarily a tool providing information relevant to a particular set or type of decisions
It is also a system that anticipates most types of relevant decisions and uses rules/guidelines to provide the "right" information for the decision

What is the Purpose of the DST

Provide the information needed to educate water stakeholders about water conditions and influences on condition and for decision-makers, sufficient information to support decisions about water sustainability



What is the Purpose of the DST?

- Report status and trends of water sustainability indicators
- Enable data provenance
- Provide policy-relevant planning and implementation information

Who is the Audience for a DST?

State and local policy-makers

Planners, managers, regulators

The public.

What are the Desired Capabilities?

- Organized around a theme of water sustainability
- Present conditions and trends in the state of California for selected sustainability indicators.
- Illustrate economic, environmental, and social benefits and tradeoffs
- Provide scientific bases to inform decisions on water management challenges for long-term sustainability.
- Facilitate querying the system to evaluate conditions and trends of indicators.
- Provide the ability to drill down to a number of specific issues and geographic areas of interest within a web-based GIS environment.

What are some components of the California Water Sustainability Atlas?

- Sustainability indicators
- Water footprint
- Ecological footprint
- Groundwater (GRACE)
- Plant Growth Index

- Other CA data (DWR, SWRCB, USGS, etc.)

Contact

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- http://Indicators.ucdavis.edu